

Hybrid Cooling Loop Technology for Robust High Heat Flux Cooling, Phase II

Completed Technology Project (2003 - 2005)

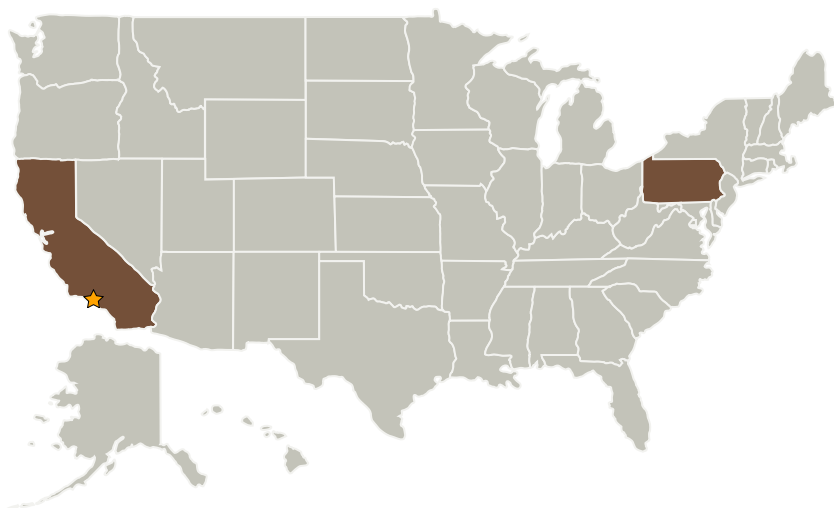


Project Introduction

Advanced Cooling Technologies, Inc. proposes to develop a hybrid cooling loop technology for space thermal control. The proposed technology combines the high heat flux performance of active cooling loops with the effective fluid management of passive cooling devices. The result is a simple, robust and high performance cooling technology that allows maximum degree of packaging flexibility. Phase I has demonstrated the technology in cooling high heat fluxes in excess of 350W/cm² from large areas in excess of 4cm² with low thermal resistances (0.008 to 0.065

o C/W/cm²). The prototype hybrid loop was tested at various orientations to verify its robust operation. The Phase I results indicated that the hybrid loop is capable of substantially outperforming the state of the art heat pipes, loop heat pipes and spray cooling systems. The principal Phase II objectives are to develop advanced performance features and qualify the hybrid loop technology for space thermal control through testing of multiple generations of prototypes and ground qualification testing of engineering units. The Phase II results will elevate the technology to a TRL 6: Prototype demonstration in a relevant environment. The follow-on Phase III will conduct flight qualification testing of the technology to address micro gravity operation issues.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Advanced Cooling Technologies, Inc.	Supporting Organization	Industry	Lancaster, Pennsylvania

Primary U.S. Work Locations	
California	Pennsylvania

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Project Manager:

Kenneth A Label

Principal Investigator:

Joel M Wilf

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors